

Plans for BELBaR

BELBaR start-up meeting, 7.-8.3.2012 Lund
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Olin
VTT Technical Research Centre of Finland

Work packages

- WP1
 - Safety assessments: current status

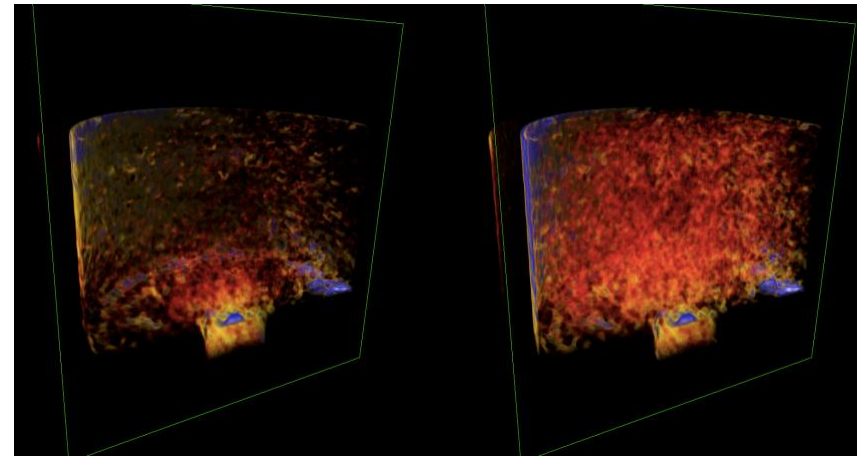
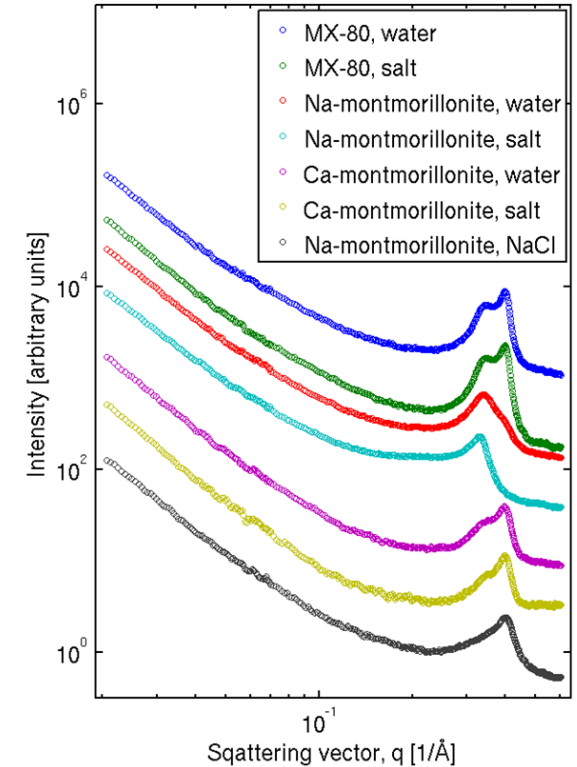
- WP2
 - Erosion experiments

- WP5
 - Modelling

Erosion experiments: background (1/2)

- Techniques used in bentonite studies in Finnish Research Programme on Nuclear Waste Management (KYT):
 - Small angle X-ray scattering, X-ray diffraction
 - microstructure: interlamellar spacing, stacks...
 - HU & VTT
 - X-ray tomography
 - density distribution in 3D
 - displacement field
 - JyU & VTT

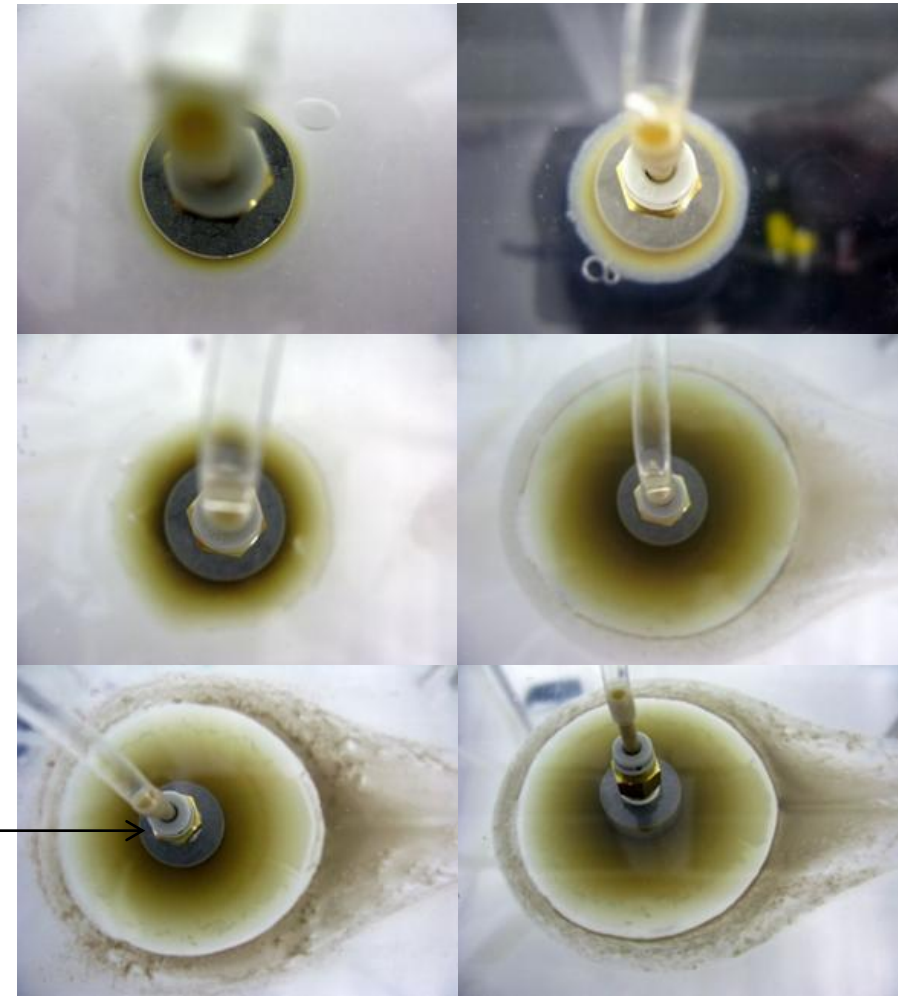
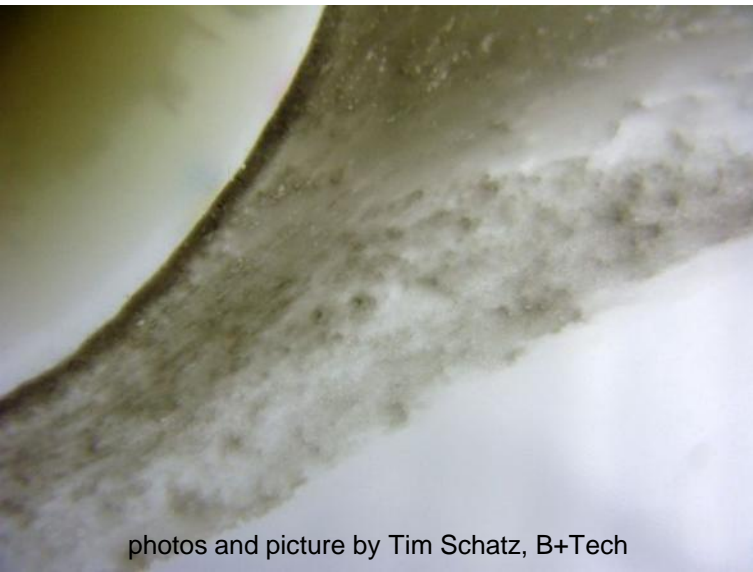
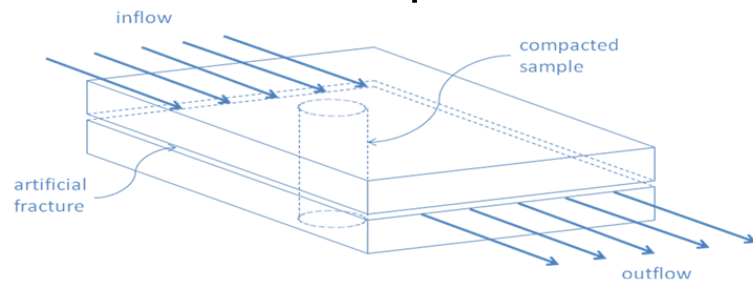
SAXS graph by Ville Liljeström, Michal Matuszewicz, Kari Pirkkalainen, Jussi-Petteri Suuronen, HU & VTT



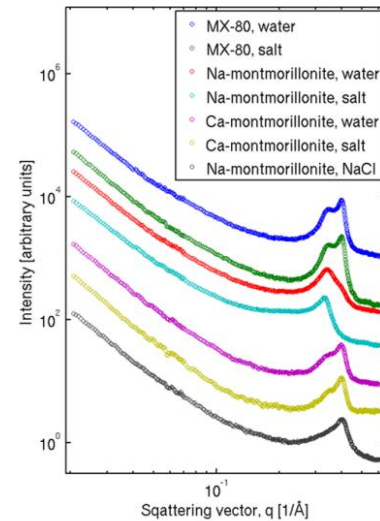
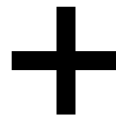
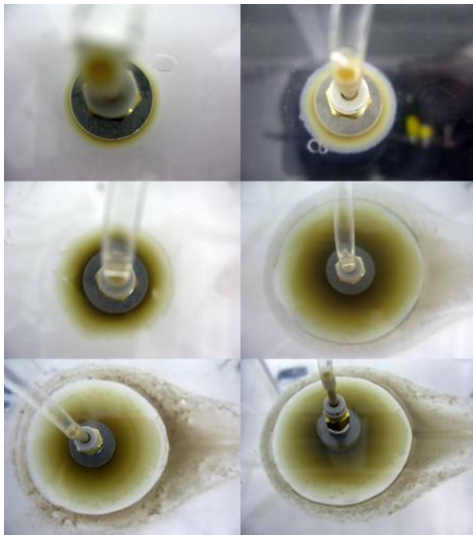
X-ray tomography pictures by Markku Kataja et. al., JyU

Erosion experiments: background (2/2)

- Work done at B+Tech
 - glacial erosion laboratory scale experiments



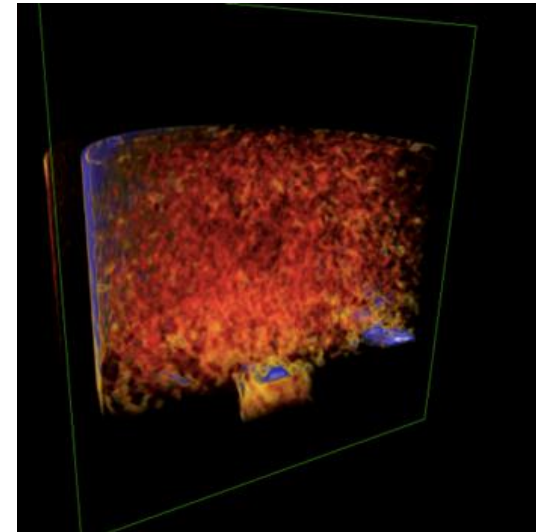
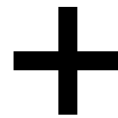
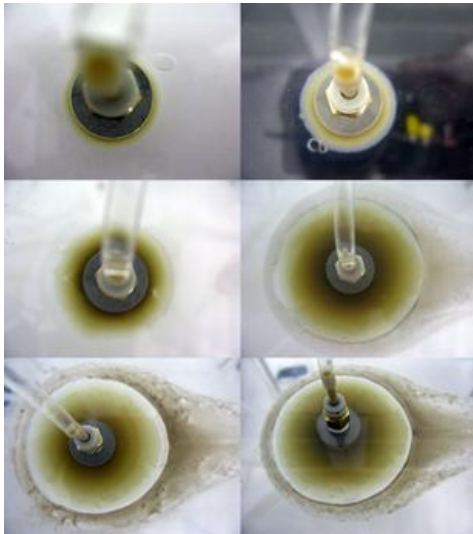
Erosion experiments: plans (1/2)



VTT
B+Tech
(HU)

- information of the microstructure from solid part towards eroding edge
- planning the experimental setup carefully and preparing the samples are the keys to make this combination work

Erosion experiments: plans (2/2)



VTT
B+Tech
JyU

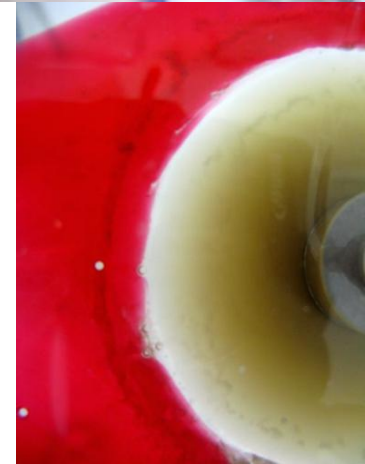
- 3D distribution of bentonite density, displacement field of bentonite
- experimental setup mimics the B+Tech's lab experiment geometry
 - capillary tubes, ...

Modelling plans (1/2)

- eroding bentonite: solid + gel + particles (colloids)
- model development process (solid + gel):
 1. collect the experimental evidence obtained this far
 2. choose a material model that is supported by the evidence (viscous, plastic, visco-elastic, visco-plastic...)
 3. give feedback for the experimentalists (which parameters are needed)
 4. get results from the experiments
 5. update the model if needed
 6. final model

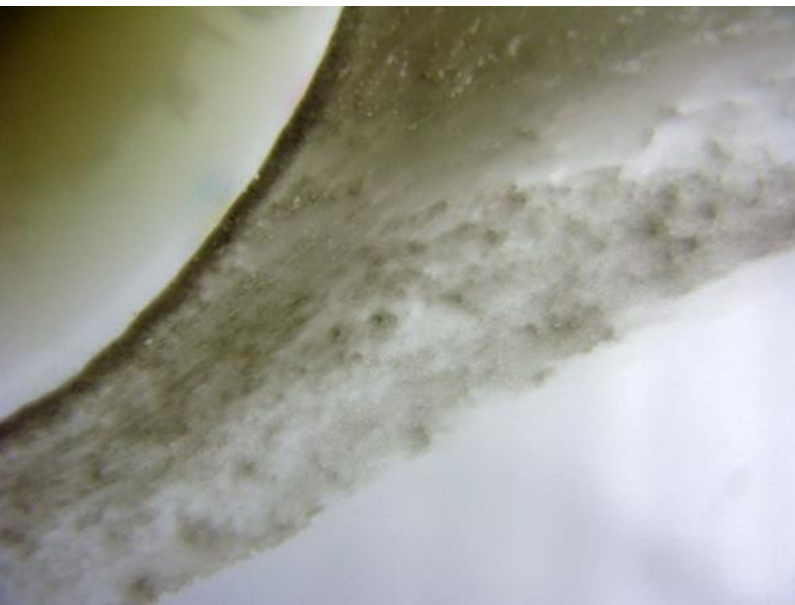
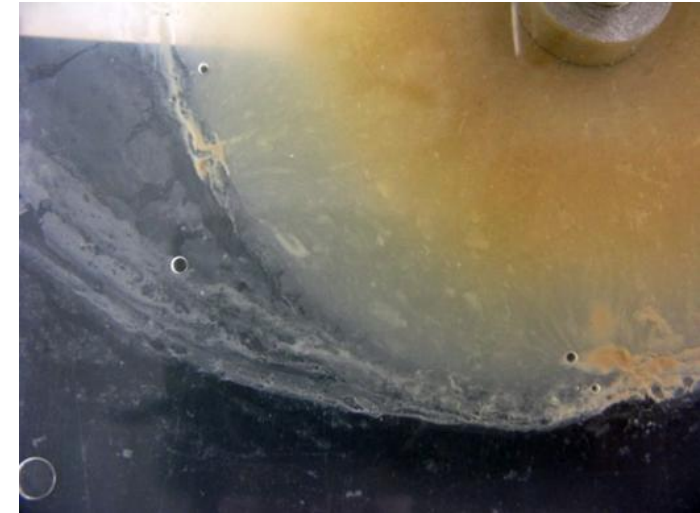


photos by Tim Schatz, B+Tech



Modelling plans (2/2)

- Bentonite-water interface
 - Detachment of the eroded mass
 - experiments & analysis needed
 - Transport of the eroding mass (particles, colloids, ...)
 - Collaboration with KIT?





Thank you!